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# Effect of Creative and Critical Thinking Skills Teaching on Identity Styles and General Health in Adolescents

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## Abstract

In this study, 40 boy students of 6th degree that were selected using random cluster, were divided into two test and control groups and responded to questionnaires of identity styles and GHQ. Then, the test group was taught thinking skills. After then, both groups were tested with creative and critical thinking skills tests, and questionnaires of pre-test. Results showed Improvement of creative and critical thinking, Identity style, and general health in the experimental group.


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## 1. Introduction

Enhancement of thinking skills is difficult but not impossible. Recent resereach show that we can teach individuals how think and chang their cognitive function ( Halpern,1988, 2003; Hernstein et al, 1986; Jepson et al., 1993; cited in Lizarraga et al., 2009). According to classification of thinking skills by Swartz and Parks (1994, cited in Burk and Wiliams, 2008) creative and critical thinking are central thinking capabilities. Creative thinking process involves the ability to produce original ideas, to perceive new and unsuspected relationships, or to establish a unique and improved order among seemingly unrelated factors (Piaw, 2010). Many scholars (Paul & Elder, 2005; Giancarlo, Blohm & Urdan, 2004; Silverman & Smith, 2002; Glaser, 1985; cited in Piaw, 2010) viewed critical thinking as the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. It is important that the effectiveness of these thinking skills examines on psychological variables such as identity and health in adolescents. Adolescence stage is considered to be an important milestone of personal identity formation. In this period an individual is aware of his feelings, values, aims, he is looking for a place in society (Sramova, 2008). Berzonsky (2004) introduced his theory as social- cognitive model of identity. He identified three identity styles that associate with the ways that people use them in the decision making process and could be mentioned as: informational identity style, normative identity style, and diffuse/ avoidance identity style. According to Berzonsky (2003), identity commitment creates a referential and directed framework that is used for reviewing, assessment and regulation of behaviors and feedbacks.

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Generally, Identity formation needs cognition and thinks about all of the things that adolescents meet them. It seems that creative and critical thinking skills are benefit intervention for this process. In this regard, Berzonsky (2004), and Hejazi and Borjaliloo (2009) founded significant positive relation between critical thinking with the informational identity style and commitment of identity. Also Blustein et.al (1989), and Shirasb (2003) showed the significant positive relation between creativity and informational identity style.

Furthermore, research into children and adolescents' health and health behavior and the factors that influence them is essential for the development of young people. It is important that young people's health is considered in its broadest sense, as encompassing physical, social and emotional well-being; and that, in accordance with the WHO perspective, health is viewed as a resource for everyday living, not just the absence of disease (WHO, 2000). It seems that creative and critical thinking teaching is effective for improving mental and physical and behavioral health in adolescence. In this regard, Settersten and Lauver (2004) showed that critical thinking is related to participation in health behaviors. Parisooz (2010) showed that critical thinking teaching have positive effect on mental health and academic achievement in students. Ghanbari and colleagues (2010) founded Positive relation between critical thinking skills and general health. Khandaghi and Pak Mehr (2011) founded positive correlation between critical thinking and mental health too. They showed that enhancement of critical thinking results in improvement of mental health. The connection between mental health and creativity has traditionally been studied in terms of outstanding aesthetic-professional creativity and mental illness. More interesting however, is the possible connection between "everyday "creativity and mental health. Everyday creativity is characterized by openness, flexibility, autonomy, playfulness, humor willingness to take risks, and perseverance (Cropley, 1990). Therefore, this research studies the effect of creative and critical thinking skills teaching on identity and general health in adolescences.

## 2. Material

### *2.1. Participants*

Forty boy students of 6$^{th}$ degree (fifteen years old) from the one high school in Tehran that was selected using a random cluster sampling method were divided into two test and control groups by random assignment.

### *2.2. Procedure*

The participants responded to questionnaires of identity styles and general health. Then, the test group through 10 educational sessions (20 hours, one session per week) was taught creative and critical thinking skills. Finally, both groups were tested with the critical thinking skills test, creativity inventory and questionnaires of pre-test.

### *2.3. Measures*

#### *2.3.1. California Critical Thinking Skills Test form B (CCTST)*

It is a multiple-choice instrument that consists six subscales including analysis, evaluation, inference, explanation, interpretation, and self-regulation. The internal reliability was computed (0.78 to 0.84). Validity was measured by correlating the CCTST with the Scholastic Aptitude Test verbal scores (correlation $\alpha$= 0.55) (Facione, 2006).

#### *2.3.2. Abedi- Scumacher creativity Test (O`Neil, Abedi and Spielberger, 1994)*

It is a multiple choice test which students rate themselves on a three-point scale on 60 questions regard as indicators for fluency, flexibility, originality, or elaboration. Azumendi, Villa and Abedi (1996; cited in Cropley, 2005) reported internal reliability of 0.61 to 0.75 for the four subscales.

#### *2.3.3. Questionnaire of identity style Inventory Berzonsky (1992)*

Six items from each of the style subscales of the Identity Style Inventory (Berzonsky, 1992) were used to assess the informational, normative and diffuse styles. Kerpelman and collegues (2008) founded for each style, scores were averaged across items ($\alpha$ = 0.76, 0.68, and 0.66, respectively, for informational, normative, and diffuse styles.

#### *2.3.4. The General Health Questionnaire, GHQ-28 (Goldberg, 1972)*

It consists of 28 items and the higher score show the poorer the psychological well-being. It provides four sub-scales rating of somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. Test-retest reliability has been reported 0.78 to 0.9 (Robinson and price, 1982; cited in Sterling, 2011) and Cronbach`s α = 0.9-0.95 (Failde and Ramos, 2000; cited in Sterling, 2011).

## 3. Intervention

The intervention consisted of a ten-week creative and critical thinking skills teaching program that administrated by the corresponding author. The participants of test group met with the trainer once a week (2 hours) for a didactic session with practice and role play, and were given homework in the end of per session.

## 4. Data analysis

The results obtained are expressed as mean±SEM (standard error of mean). MANCOVA was used to test the efficacy of the creative and critical thinking skill teaching relative to the waitlist control.

## 5. Results

### *5.1. Descriptive statistics*

Table 1. Descriptive statistics

| | | Experimental group | | Control group | |
|---|---|---|---|---|---|
| | **Group** | Mean | Standard Deviation | Mean | Standard Deviation |
| Informational identity style | Pre test | 39.05 | 4.99 | 40.55 | 5.82 |
| | Post test | 41.15 | 4.67 | 36.70 | 5.06 |
| Normative identity style | Pre test | 32.25 | 4.14 | 31.50 | 3.99 |
| | Pots test | 31.45 | 3.35 | 31.45 | 4.91 |
| diffuse/ avoidance identity style | pre test | 29.90 | 6.73 | 25.35 | 6.23 |
| | Post test | 25.80 | 5.78 | 26.40 | 4.71 |
| Commitment | Pre test | 34.50 | 5.40 | 38.30 | 5.14 |
| | Post test | 37.65 | 4.88 | 35.85 | 6.20 |
| General Health | Pre test | 28.05 | 11.51 | 28.60 | 10.02 |
| | Post test | 24.65 | 7.94 | 29.15 | 11.36 |
| Somatic symptoms | Pre test | 5.20 | 3.38 | 5.60 | 3.56 |
| | Post test | 4.45 | 3.68 | 6.35 | 3.91 |
| Anxiety and insomnia | Pre test | 4.90 | 4.28 | 5.40 | 3.27 |
| | Post test | 1.70 | 2.23 | 5.10 | 4.48 |
| Social dysfunction | Pre test | 14.55 | 2.63 | 14.10 | 2.95 |
| | Post test | 14.75 | 3.39 | 13.10 | 3.82 |
| Severe depression | Pre test | 3.25 | 5.50 | 3.65 | 4.67 |
| | Post test | 2.05 | 2.89 | 4.65 | 7.07 |

Table 1 showed that informational identity style increased, and general health and its components decreased in the experimental group after the intervention.

### *5.2. Inferential statistics*

Table2. Independent t test for creative and critical thinking between experimental and control groups

| | Experimental group | | Control group | | | |
|---|---|---|---|---|---|---|
| | Mean | Standard Deviation | Mean | Standard Deviation | t (38) | *P*< |
| Creative thinking | 89.75 | 16.97 | 79.90 | 18.23 | 2.77* | .001 |
| Critical thinking | 10.80 | 2.35 | 7.60 | 2.76 | 3.95* | .005 |

Table 2: showed that creative and critical thinking significantly increased in experimental group after teaching.

Tabel3. Identity styles differences before and after the training program

| Source | Dependent Variable | Sum of Squares | Df | Mean Square | F | *P*< | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Group | Post test for informational identity | 209.996 | 1 | 209.996 | 10.251 | .003 | .232 |
| | Post test for normative identity | 4.950 | 1 | 4.950 | .419 | .522 | .012 |
| | Post test for diffuse/ avoidance identity | 71.911 | 1 | 71.911 | 4.190 | .048 | .110 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Post test for commitment of identity | 102.190 | 1 | 102.190 | 4.327 | .045 | .113 |

*Continued*

Table 4.Identity styles differences before and after the training program *Continued*

| Source | Dependent Variable | Sum of Squares | Df | Mean Square | F | P< | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Group | Post test for informational identity | 209.996 | 1 | 209.996 | 10.251 | .003 | .232 |
| | Post test for normative identity | 4.950 | 1 | 4.950 | .419 | .522 | .012 |
| | Post test for diffuse/ avoidance identity | 71.911 | 1 | 71.911 | 4.190 | .048 | .110 |
| | Post test for commitment of identity | 102.190 | 1 | 102.190 | 4.327 | .045 | .113 |
| Error | Post test for informational identity | 696.523 | 34 | 20.486 | | | |
| | Post test for normative identity | 401.607 | 34 | 11.812 | | | |
| | Post test for diffuse/ avoidance identity | 583.470 | 34 | 17.161 | | | |
| | Post test for commitment of identity | 802.961 | 34 | 23.617 | | | |
| Total | Post test for informational identity | 61705.000 | 40 | | | | |
| | Post test for normative identity | 40236.000 | 40 | | | | |
| | Post test for diffuse/ avoidance identity | 28308.000 | 40 | | | | |
| | Post test for commitment of identity | 55238.000 | 40 | | | | |

Table4: MANCOVA showed that informational identity style and commitment of identity were increased and diffuse/avoidance identity styles were decreased in post test of experimental group after training. Effect sizes of these variables are 0.232, 0.113 and 0.110 respectively. Using Cohen's instructions (1988) that introduce small effect size of 0.01, medium effect size of 0.06 and large effect size of 0.14, the mentioned effect sizes are too big.

Tabel 5. General health differences before and after the training program

| Source | Dependent Variable | Sum of Squares | Df | Mean Square | F | P< | Partial Eta Squared |
|---|---|---|---|---|---|---|---|
| Group | Post test of general health | 166.912 | 1 | 166.912 | 4.669 | .038 | .124 |
| | Post test of somatic symptoms | 33.017 | 1 | 33.017 | 4.046 | .050 | .109 |
| | Post test of anxiety and insomnia | 98.633 | 1 | 98.633 | 10.864 | .002 | .248 |
| | Post test of social dysfunction | 25.667 | 1 | 25.667 | 2.141 | .153 | .061 |
| | Post test of severe depression | 74.056 | 1 | 74.056 | 4.226 | .048 | .114 |
| Error | Post test of general health | 1179.721 | 33 | 35.749 | | | |
| | Post test of somatic symptoms | 269.289 | 33 | 8.160 | | | |
| | Post test of anxiety and insomnia | 299.611 | 33 | 9.079 | | | |
| | Post test of social dysfunction | 395.535 | 33 | 11.986 | | | |
| | Post test of severe depression | 578.293 | 33 | 17.524 | | | |
| Total | Post test of general health | 32794.000 | 40 | | | | |
| | Post test of somatic symptoms | 1750.000 | 40 | | | | |
| | Post test of anxiety and insomnia | 1054.000 | 40 | | | | |
| | Post test of social dysfunction | 8279.000 | 40 | | | | |
| | Post test of severe depression | 1626.000 | 40 | | | | |

Table5: MANCOVA showed that scores of general health, somatic symptoms, anxiety and insomnia, and severe depression were significantly decreased in post test of experimental group after training. Effect sizes of the above variables are 0.124, 0.109, 0.248 and 0.114 respectively that are too big.

## 6. Discussion

Results show that creative and critical thinking skills teaching in students can increase informational identity style, commitment of identity, and general health. Furthermore, these teaching decrease diffuse/avoidance identity style, somatic symptoms, anxiety and insomnia, and severe depression. In the present study, the small sample size and the brief period between the pretest and the posttest may have made demonstrating substantial changes more difficult. Despite these limitations, noteworthy benefits were demonstrated. We observed that learning thinking

skills could significantly improve the participants' creative and critical thinking skills. This is in line with the researches of thinking skills teaching, which emphasized improvement of cognitive functions and elaborative techniques of problem solving and decision making (e.g., Baron and Sternberg, 1987; Halpern, 1988, 2003; Hernstein et al, 1986; Klauer, 1990, 1992; Swartz and Parkz, 1994; cited in Lizarraga et al., 2009). The results of the study indicate that after the thinking skills teaching program, the students in the experimental group had an increased in informational identity style and commitment of identity, while had a decreased in diffuse/avoidance identity style. This finding is consistent with Berzonsky (2004), Blustein and collegues (1989), Hejazi and Borjaliloo (2009), Shirasb (2003), that all of them showed that creative thinking and critical thinking are related with improvement of identity and commitment. According to Berzonsky (2004) and Berzonsky and Salivan (1992) there are relationship between identity style and cognitive reasoning, individuals with informational identity style actively process information (demonstrate more analyze, evaluation, reasoning, inferential,) Furthermore, they are high need for cognitive (use fluency and elaborative), they have more acceptance about new idea (show flexibility and openness) and have more arousal and personal feeling (demonstrate more innovation and initiative). Therefore, individuals with informational identity style have more creative and critical thinking skills than other identity styles. On the other hand, this study showed that creative and critical thinking skills teaching improve general health and its components. This finding is consistent with several studies such as; Settersten and Lauver (2004), Parisooz (2010), Ghanbari and colleagues (2010), Khandaghi and Pak Mehr (2011). Critical thinking has been proposed as crucial for processing conflicting information when people make decisions about participation in health behaviors, and there are relations between critical thinking and participation in various types of health behaviors (Settersten and Lauver, 2004). Furthermore, the characteristics of creativity are consistently emphasized in models of "normal"; personality growth, so that the possibility of promoting mental health arises by fostering creativity in day to day life (Cropley, 1990). This issue results in a decrease psychosomatic, anxiety, insomnia and depression and promotion general health in adolescences with higher creative and critical thinking.

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